DOCUMENT RESUME

ED 052 132 SP 004 906

AUTHOR	McDonald, F. J.
TITLE	Applying the Language of Behavioral Models to Teaching Acts.
INSTITUTION	Stanford Univ., Calif. Stanford Center for Research and Development in Teaching.
SPONS AGENCY	Office of Education (DHEW), Washington, D.C.
REPORT NO	RM-3
BUREAU NO	BR-5-0252
PUB DATE	67
CONTRACT	OEC-6-10-078
NOTE	20p.
EDRS PRICE	EDRS Price MF-$0.65 HC-$3.29
DESCRIPTORS	*Behavioral Sciences, *Classroom Communication, *Classroom Observation Techniques, *Communication Skills, *Information Theory

ABSTRACT

This paper illustrates how behavioral models which embody a critical language can be used to describe and predict some categories of classroom events. It defines teaching-learning as a set of events which are mediated primarily by a person, the consequence of which is change in behavior of a second person. A language for describing this phenomenon is needed which should denote those events which may properly be called instruction and those which should be labeled in other ways. The use of behavioral models has three advantages: 1) the models are relatively simple; 2) they require the fewest number of assumptions about the phenomena being described; and 3) there is a rich information bank about behavior analyzed in these terms. Three broad categories of theoretical models seem useful: 1) the Skinnerian-type model of instrumental conditioning; 2) the Miller "drive-cue-response-reinforcement" model; and 3) the Bandura social-learning model. The problems in using behavioral models are of two kinds--those which are the consequences of extending a model by analogy to a new set of phenomena, and those which occur when communicating with investigators who do not use these models. The essential phenomenon of education is the acquisition of formal symbolic systems for the analysis and synthesis of experience; therefore the critical language of education must be concerned primarily with describing the methods of acquiring these symbolic systems. (MBM)

ED052132

STANFORD CENTER FOR RESEARCH AND DEVELOPMENT
IN TEACHING

Research Memorandum No. 3

APPLYING THE LANGUAGE OF BEHAVIORAL MODELS TO TEACHING ACTS

by

F. J. McDonald
Stanford University

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

This memorandum is a draft for interoffice circulation. Corrections and suggestions for revision are solicited. The memorandum should not be cited as a reference without specific permission of the author. It is automatically superseded upon formal publication of the material. The research and development reported herein was performed pursuant to a contract with the United States Department of Health, Education, and Welfare, Office of Education, under the provisions of the Cooperative Research Program.

School of Education
Stanford University
Stanford, California

March 1967

SP004906

Developing a critical language for the analysis of classroom behavior means developing a symbol system which can be used to make statements about events which occur in classrooms. Such statements are to be predictions about relations between variables defining teaching behavior and those defining pupil learning. A critical language is one that can be used by different investigators to talk about the same events. The predictive and explanatory statements are to embody this language. As a language, it is essentially a set of symbols denoting teaching behavior, a set denoting pupil learning, and a set of conventions for relating these symbols.

The argument for a critical language is clear. Common symbols promote communication, focus attention and energy on common problems, and simplify theory construction. The time is ripe for developing such a language when interest in a phenomena is high and when investigators need to compare and to contrast the results of their research. This paper illustrates how behavioral models, which embody a critical language, can be used to describe and to predict some categories of classroom events.

The term "classroom behavior" is here a convention for "teaching activities and their consequences," events which typically occur in a place called "a classroom." However,

I do not think that we need confine an analysis of teaching-learning events to those which occur only in places formally designated as classrooms. Nor need we think of teaching-learning events as exclusively mediated by persons formally designated as teachers. At least for my purposes, teaching-learning is a set of events which are mediated primarily (though not exclusively) by a person, the consequence of which is change in behavior of a second person, where the change is a modification by acquiring or extinguishing behavior. The basic phenomena with which we are concerned is <u>instruction</u>; a language for describing this phenomena is needed. The development of such a language (it seems to me) is inhibited if a new language is developed each time instruction occurs in a different place or is controlled by a different kind of person. I prefer to conceive of a basic or common language describing instruction with many dialects to indicate local origins, the dialects being modifications of the basic language within locales such as those instances of parent-child interaction which are instructional or those aspects of psychotherapy which are instructional.

The purpose of this disclaimer is not to suggest that teaching lacks uniqueness but to point up the basic problem

in developing a language about teaching. This language must denotate those events which properly may be called teaching or instruction and those which are to be labeled in other ways. It is not immediately apparent that a teacher in a classroom and a parent interacting with a child are different classes of stimuli when each is engaged in instructional acts. Nor is it clear that the child is learning different classes of responses in different situations. He may be learning concepts or skills or facts whether at home or in school.

I have chosen to think in terms of behavioral models about such problems because using them enables us to avoid this problem (of specifying univocally what teaching is) while still doing research relevant to it, and also enables us to test the generalizability of concepts across different learning situations, a necessary step prior to assessing the requirements for defining teaching. Using behavioral models for the analysis of teaching-learning behavior commits one to conceptualizing events more broadly. Or, if one subsequently narrows the definition of teaching, such narrowing will occur as a consequence of defining a class of stimuli which have common properties.

In either case, we will be assessing the extent to which an event called teaching requires a unique denotation.

Developing a critical language is essentially a process of choosing a model for the phenomena one wishes to describe. We select a way of thinking about the world of teaching-learning events. Obviously, there are an infinite number of ways that one can talk about that world of observables. We may use a "natural" language or, as I propose, we may adopt a more formal language for the purposes of description, explanation, and communication.

ADVANTAGES OF USING BEHAVIORAL MODELS FOR THE ANALYSIS OF TEACHING

In principle, one can give only heuristic arguments for the selection of a particular model and its associated language. Using behavioral models has three advantages: (1) These models are relatively simple. In the early stages of the analysis of a phenomena, the simpler the model one uses, the more likely he is to make progress in understanding the phenomena he is studying. (2) Behavioral models require the fewest number of assumptions about the phenomena one is attempting to describe. Thus, the law of parsimony is respected. (3) We have an extraordinarily rich information bank about behavior analyzed in these terms. For me, the third reason is in many ways the most important. Behavioral psychology has provided reasonably succinct and

well substantiated statements about behavior. These statements are convenient starting points for the analysis of classroom behavior.

The best example of facilitating progress by applying an established and documented concept system is the current interest in the application of Skinnerian ideas to a wide range of phenomena. Recently, we began an analysis of the problem that teachers call the "discipline problem." We began by making video recordings of intern teachers who had been identified as having the most serious discipline problems. Their classrooms were disorderly, where disorder is to be taken as a euphemism for 'bordering on riot.' We placed an observer in the classroom whose task was to try to assess what was going wrong. Simultaneously extensive video recordings were made of the classroom events.

We study these video recordings and try to analyze the sequence of events that accounts for the very obvious instances of disorder. It is precisely at this point, when the observer confronts the observables, that a model becomes critical. Obviously, there are a number of models that one can impose on these events in terms of which these events may be classified and interrelated.

We initially tried to identify those stimuli which seemed

to be eliciting certain classes of student responses. However, it seemed simpler to look at the sequence of events in terms of the kinds of reinforcement contingencies that the teacher was establishing. We saw a teacher who announced that whenever a child wished to speak in class he must raise his hand. The first child on whom he called had not raised his hand. This observation led us to watch thos kinds of events which the teacher was reinforcing. It was obvious that the behaviors being reinforced were precisely those behaviors which the teacher did not want. These behaviors summated into larger classes of behavior, which occurring in many individuals produced a state of disorder.

I do not wish to oversimplify the complexity of these events. I merely wish to point out that by thinking in terms of reinforcement contingencies it seemed to be easier to identify a sequence of events. I add, without elaborating, that we were able to modify the teacher's behavior by a training program which enabled her to identify the kinds of reinforcement contingencies she was establishing. The subsequent modifications of the children's behavior when the teacher introduced new contingencies, may be regarded as evidence that applying the reinforcement contingency model was a useful approach.

The advantage of applying this particular model to this

particular set of phenomena is the same as that of applying any model to any phenomena. We now can do a detailed analysis of the kinds of contingencies that teachers apply to various classes of student behavior and trace the consequences of these contingencies. We are capitalizing on both the concept and the methodology developed in its analysis. We can also train teachers to vary contingencies with respect to various classes of student behavior and as a consequence determine the extent to which student behavior is modifiable. For example. in our first experiment (McDonald and Allen, 1964) we increased the frequency with which teachers reinforced students participatory behavior (students speaking verbally on a topic). Although our primary interest was finding ways of modifying the teachers' behavior we analyzed our data to see the effect of the changes in teachers' behavior on changes in pupil behavior. We noted a marked increase in the rate of student responding when teachers reinforced the act of participating in classroom discussions.

In both these instances we utilized the concept of reinforcement contingencies. (Parenthetically, I should note that the same concept was applied to develop a training procedure to modify the teachers' behavior.) Thus, a single concept is used to organize a wide range of discrete teaching events.

KINDS OF BEHAVIORAL MODELS

As we all know, there is no one behavioral model accepted by all investigators. There are several different kinds of behavioral models and the history of both psychology and education has been markedly influenced by disputes about their respective validities. For the purposes of analyzing classroom behavior, it seems to me that three broad categories of theoretical models are particularly useful. The first of these I have referred to previously, the Skinnerian-type model of instrumental conditioning. A second model is the "drive-cue-response-reinforcement" model utilized by Neal Miller. Third, there is the social-learning model as developed by Bandura. Each of these models emphasizes a different aspect of the general stimulus-response behavioral model - the Skinnerian model, the reinforcement of response, the Miller model, the cue-response link, and the Bandura social learning model, the elicitation aspect, the cue part of the model.

It seems unimportant and even unwise to me to commit oneself to any one of these models as the ultimate conceptual tool. I find each useful for somewhat different purposes. For example, we found it much easier to apply the instrumental conditioning model to the analysis of social control. However, we are also attempting to apply the Miller model to the same

kind of a problem. Here, we are looking at anxiety as a drive state in the teacher and asking to what kinds of cues does a teacher in an anxiety state become sensitive; what kinds of responses do these cues elicit, and what events reinforce the cue-response connection. Similarly, the teacher's behavior may be conceptualized as a cue arousing anxiety states in students which lead to certain kinds of responses which are reinforced by the kinds of behavior that the teacher calls "disorderly." Hopefully, we may map a complex interaction chain to account for a heightened state of anxiety in both the teacher and the pupil, the symptom of which is the disorderly behavior of the pupil, or some analogously deviant behavior in the teacher.

My experience in applying the social learning model has been principally in modifying teacher behavior. We have used the model as a way of eliciting certain desired teacher behaviors (which are assumed to have significant effects on pupil behavior.) Our research has been to identify those characteristics of models which elicit the desired behavior in teacher-trainees. The application of the ideas of social learning theory in this line of research are straightforward.

In listing these three subcategories of behavioral models and examples of their application, I inevitably convey

the impression of eclecticism. I am happy to do so because at this stage in the development of our thinking I believe that it would be premature to commit oneself to one model for the analysis of all classroom behavior.

But why choose behavioral models? My reasons are simply those stated above, and they are essentially the reasons that many people prefer to use the behavioral model. Another reason may be added here. Many different kinds of behaviors can be subsumed into concepts whose operational definitions have been developed in other contexts and whose empirical correlates are known. The ultimate test of the use of the models is that we will be able to account for a significant number of events by their use.

PROBLEMS IN USING BEHAVIORAL MODELS

The problems in using behavioral models are twofold: (1) those which are the consequences of extending by analogy a model to a new set of phenomena; (2) those which occur when communicating with other investigators who do not use these models. This latter problem is the substance of this panel. I will return to it shortly.

The first problem in using behavior models for research is a technological one. For example, it is difficult to establish reinforcement contingencies for certain classes of

behaviors. I am referring here to the problem of getting reinforcement contingencies into the situation. One cannot administer verbal reinforcers during a lesson directly, for example. In applying these models to the modification of teacher behavior we have used as a technological device the video recording. This enables us to reinstate the teacher's behavior and to apply reinforcement methods in the context of having a subject watch his own behavior in the presence of an experimenter. This arrangement represents a considerable modification of reinforcement technologies, but no special problems have arisen in this extrapolation of the basic model.

In applying social learning models, it is difficult to create modeling situations, carefully controlled, in which a teacher can observe another teacher achieving significant rewards for enacting a class of teacher behavior. It is no trick to expose teachers to teaching models, but we have not applied social learning theory to the modification of teacher behavior unless we apply the basic principles in social learning theory. Such an application would require us to demonstrate the connection between the model's behavior and its consequences. Arranging such contingencies is not simple. This problem is real but not insurmountable.

The problems of extending the analogy are more complex.

In applying social learning theory we expose, as I said above, teachers to models who are enacting teacher behaviors. One of the problems when an adult human observer watches another adult is predicting what the observer will observe. Using a social learning theory model, we usually assume that the observer is "tuned in" on those behaviors which produce the most significant rewards for the actor being observed. But when the observer is an adult observing a complex phenomena such as a teaching behavior, it is not always clear what he will regard as rewarding. Nor is it clear what kinds of connections he will see between the teacher's behaviors and rewarding consequences. In fact, he may disregard those behaviors which have been very carefully linked to certain kinds of rewards.

Another instance of difficulties in applying behavioral models is extending the notion of delay of reinforcement to a contingency such as teaching. When you can "reinstate" a person's behavior in his experience by showing him a video recording of his teaching, the concept of delay is no longer directly applicable, or has to be modified in some way which is not at all clear. If, for example, an adult instructor (called by us an experimenter, called by the teacher, a supervisor) can modify the teacher's behavior by reinforcing it, we ordinarily would think that postponing that reinforcement

until some time after the teaching behavior occurred would slow up the process of behavior modification. However, certain kinds of concepts developed in learning theory are simply a function of the kinds of learning environments or stimulus-response, time-space connections that we have established operationally. For example, many days later one can reinstate the original behavior in a video recording and the experimenter can reinforce the teacher by rewarding him with verbal approval each time certain behaviors occur in the recording. These arrangements produce the desired modification.

Note also that the reinforcement administered in this case is not contingent on the behavior itself but is administered when the behavior is reenacted during the viewing of a recording. It is comforting to find that the extrapolation of the behavioral model to such a situation seems to "work." But we must, at some point, seriously raise the questions whether we are extrapolating from the original model or creating a new model of behavior modification.

The other problem in using behavioral models is communicating with other investigators. One cannot impose his language on other investigators. He can only demonstrate that by using his particular model he has made some significant contribution to our understanding of a particular phenomena. Nor can any of us predict in advance that the particular

language and model we adopt is most likely to be fruitful. We may be the unwitting victims of current fashions and fads.

The central problem in developing a common symbol system is to describe or to specify in some way what it is that we want to talk about. Miller and Dollard in applying a behavioral model to psychotherapy began by defining what psychotherapy was: "Emotional re-education, unlearning of maladaptive responses and learning of more adaptive ones." Although this statement is necessarily general (and could in the broadest sense describe teaching), it placed the process of psychotherapy in the category of processes which modify learned responses and stimulate the acquisition of new responses.

Miller and Dollard's next problem was to identify the general nature of the responses which needed to be modified. Here they established a link between a common conception; maladaptive responses and their behavioral model. Utilizing essentailly a Freudian conception of defense process they mapped the main elements in Freud's conception of defense into the basic components of drive-cue-response-reinforcement model. The behavioral model became a way of refining, and generalizing the kinds of concepts which were in the original Freudian model.

The advantages of doing this are clear. It is no longer

necessary, if their conceptual scheme is accepted, to classify a variety of defense mechanisms. It is simpler to think in terms of cue-produced responses, response heirarchies, and reinforcement contingencies. The mechanism of psychological defense becomes clear. Given greater understanding of the mechanism it is possible to modify the mechanism. The predictions of relations can be transported to these processes from previous work on learning phenomena. Further, ways of changing can be hypothesized within the framework of the system. For example, Miller and Dollard describe the process of psychotherapy as a kind of teaching or educational process in which the psychotherapist facilitates the modification of response heirarchies.

It seems to me we can learn a lesson from Miller's and Dollard's work. Freudian conceptions are a step beyond a natural language. Freud contributed conception of maladaptation, based on an etiological model of illness and health, in which defense and pathology were interrelated. Miller and Dollard translate this conception into behavioral language, giving the conception the power of the rigor of behavioral language, the advantage of its parsimony, and the support of its empirical base. Great generality is achieved in this way.

The first step in developing a critical language for

analyzing teaching behavior is some comparable achievement. (Unfortunately, in education the chain of events has been reversed. We tend to move from some psychological theory to a conception of teaching.) But before such a basic conception can be developed, another step is required. We must be as clear as we can be about the phenomena with which we are concerned. We must answer the question, what is it that we are doing when we educate. Some subset of events relatively unique to classroom experience and formal teaching need to be identified. Here we would be seeking for something comparable to the class of events about which Freud theorized, in that case, maladaptive behavior producing intense emotional pain.

Although I recognize that educators and others have argued for centuries about the proper function of education, I will risk stating what I think to be unique about what is formally called education. I think the essential phenomena of education is the acquisition of formal symbolic systems for the analysis and synthesis of experience. I think, therefore, that the critical language of education must be concerned primarily with describing the phenomena of acquiring these symbolic systems.

A first step, comparable to what Freud did for psychiatry, is describing the general categories of events and the

general process by which such symbol systems are acquired. I am not at all clear whether this step is essential, but it is heuristic. Given a language about the acquisition of symbol systems, the next step seems to be to map these concepts and symbols into the language of formal models.

I think this intermediate step is the link necessary to develop a communicative language. We need to agree what it is that we are talking about and to find a relatively simple and perhaps simple-minded language for talking about it. Given some agreement on this language it then makes little difference to me, except in terms of personal preference and conviction, what formal system one then adopts for scientific investigation. At the present stage of our conceptual development multiple theoretical approaches might very well be better than a single approach.

I recognize that my own work in applying behavioral models to teaching behavior has not always focussed on the acquisition of symbolic systems. However, I regard the work that we have recently begun on the "discipline problem" as related to the problem of providing the appropriate conditions of learning. A certain type of interaction phenomena is necessary between teacher and student before symbol systems can be acquired. I regard our work on the modification of teacher behavior as a necessary step in creating the stimuli

required to produce the acquisition of symbol systems.

In both cases I regard the application of behavioral models to the specific phenomena to which they have been applied as a proof in principle that this formal language for the analysis of behavioral events is readily applicable to classroom behavior. I do not insist that this formal language be adopted as the basic communicative language, any more than a mathematician might insist that the only language for the analysis of other physical phenomena is the calculus. I claim no more than that these behavioral models are powerful tools which ought to be used to the utmost.

I do not believe that the use of such models will clarify our understanding of classroom behavior. I do believe that applying these models to relatively complex phenomena demonstrates their utility for analysis, and is a step on the way to their use in the analysis of the central phenomena of education, the acquisition of symbol systems.

The disciplinary advantage of using such language should not be overlooked. Creating models of teaching behavior, particularly when the technology of the video recording is used, is a powerful way of describing behaviorally a class of teacher behavior. Similarly, describing the behavior of "reinforcing student behavior" forces one to look at the range of a teacher's verbal statements to sort out those

thought likely to be reinforcing, opening a nest of problems that ought not be overlooked.

Extending a model by analogy requires one to conceptualize the process again and again. Whether this discipline is more likely to be helpful than beginning "de novo" I do not know. But the demands of using a behavioral language, I would assert, bring an investigator closer to the phenomena of interest than any other language. Behavioral models require the investigator to look at the specific teacher behavior-pupil behavior, antecedent-consequent relation.

All of this is an argument for the heuristic value of behavioral models and language. Not everybody will be convinced.

In the meantime, I would hope that sufficient agreement could be reached on the central phenomena of the educational process that the development of a critical language focussed on this central phenomena. The incompatibilities in our language systems are as much a function of, in my opinion, the fact that we are talking about different things than the fact that we are talking a different language about the same thing.